

Examlet 2 Foundations of Advanced Math 2/26/10

1. a) Let $A = \{1,2,3\}$ and $B = \{2,3,4\}$. What is $A \cup B$?

b) Let $A = \{1,2,3\}$ and $B = \{2,3,4\}$. What is $A \cap B$?

c) Let $C = [3, 5]$ and $D = [4, 8]$. What is $C - D$?

d) Let $E = \{1,2\}$ and $F = \{5, 7\}$. What is $E \times F$?

2. a) Let $\mathbb{N}^+ = \mathbb{N} - \{0\}$. Let $A_n = (0, n)$ for each $n \in \mathbb{N}^+$. What is $\bigcup_{n \in \mathbb{N}^+} A_n$?

b) Let I be a set such that for each $i \in I$, A_i is itself a set. Then $\left(\bigcup_{i \in I} A_i \right)' = \bigcap_{i \in I} A_i'$.

3. a) $\forall x, y \in \mathbb{R}$, If $|x| \leq y$, then $-y \leq x \leq y$.

b) $\forall x, y \in \mathbb{R}$, If $-y \leq x \leq y$, then $|x| \leq y$.

4. Let A , B , and C be sets. If $A \subseteq B$, then $A - C \subseteq B - C$.

5. a) $\forall a, b, c, d \in \mathbb{R}$, if $a > b$ and $c > d$, then $a + c > b + d$.

b) $\forall a, b, c, d \in \mathbb{R}$, if $a > b$ and $c > d$, then $a \cdot c > b \cdot d$.

